WHAT IS CLAIMED IS:

1. A lamellar diffraction grating comprising:

a substrate; and

an arrangement of generally rectangular protrusions spaced along the substrate at an average grating period a, wherein an average height h and an average width w of the protrusions is such that $h / a > 0.5$ and $w / a < 0.5$.

2. The lamellar diffraction grating recited in claim 1 wherein the generally rectangular protrusions have substantially equal heights and have substantially equal widths.

3. The lamellar diffraction grating recited in claim 1 wherein the grating period corresponds to a line density $1/a$ between 700 and 1100 protrusions/mm.

4. The lamellar diffraction grating recited in claim 1 wherein the grating period corresponds to a line density $1/a$ between 800 and 1000 protrusions/mm.

5. The lamellar diffraction grating recited in claim 1 wherein h/a is between 0.7 and 1.1 and wherein w/a is between 0.15 and 0.3.

6. The lamellar diffraction grating recited in claim 1 wherein h/a is between 0.75 and 1.0 and wherein w/a is between 0.2 and 0.3.

7. The lamellar diffraction grating recited in claim 1 wherein h/a is between 0.84 and 0.96 and wherein w/a is between 0.22 and 0.3.

8. The lamellar diffraction grating recited in claim 1 wherein the width of each protrusion is defined by a FWHM measurement of a profile of such protrusion.

9. A method for diffracting an optical signal, the method comprising:

propagating the optical signal towards an arrangement of generally rectangular protrusions spaced along a substrate at an average grating period a, wherein an average height h and an average width w of the protrusions is such that $h / a > 0.5$ and $w / a < 0.5$; and

reflecting the optical signal from the arrangement.

10. The method recited in claim 9 wherein each of the generally rectangular protrusions has a substantially equal height and width.

11. The method recited in claim 9 wherein the grating period corresponds to a line density $1/a$ between 700 and 1100 protrusions/mm.

12. The method recited in claim 9 wherein the grating period corresponds to a line density $1/a$ between 800 and 1000 protrusions/mm.

13. The method recited in claim 9 wherein h/a is between 0.7 and 1.1 and wherein w/a is between 0.15 and 0.3.

14. The method recited in claim 9 wherein h/a is between 0.75 and 1.0 and wherein w/a is between 0.2 and 0.3.

15. The method recited in claim 9 wherein h/a is between 0.84 and 0.96 and wherein w/a is between 0.22 and 0.3.

16. The method recited in claim 9 wherein the width of each protrusion is defined by a FWHM measurement of a profile of such protrusion.

17. A lamellar diffraction grating comprising:

substrate means; and

means for reflecting an optical signal, such means for reflecting the optical signal including an arrangement of generally rectangular protrusion means spaced along the substrate means at an average grating period a, wherein an average height h and an average width w of the protrusions is such that $h / a > 0.5$ and $w / a < 0.5$.

18. The lamellar diffraction grating recited in claim 17 wherein the grating period corresponds to a line density $1/a$ between 800 and 1000 protrusions/mm.

19. The lamellar diffraction grating recited in claim 17 wherein h/a is between 0.84 and 0.96 and wherein w/a is between 0.22 and 0.3.

20. A method for fabricating a lamellar diffraction grating, the method comprising:

forming a pattern for an anisotropic hard etch mask over a surface of a substrate, the pattern having an average grating period a and defining an average protrusion width w for the lamellar diffraction grating such that $w / a < 0.5$; and

etching a plurality of gaps into the substrate through the patterned anisotropic hard etch mask to an average depth h such that $h / a > 0.5$.

21. The method recited in claim 20 wherein the grating period corresponds to a line density $1/a$ between 800 and 1000 protrusions/mm.

22. The method recited in claim 20 wherein h/a is between 0.84 and 0.96 and wherein w/a is between 0.22 and 0.3.

23. The method recited in claim 20 wherein forming the pattern for the anisotropic hard etch mask comprises:

depositing the anisotropic hard etch mask over the substrate;

forming a layer of photoresist over the anisotropic hard etch mask;

exposing the pattern onto the layer of photoresist;

etching the anisotropic hard etch mask through the pattern in the layer of photoresist; and

removing the layer of photoresist.

24. The method recited in claim 23 wherein etching the anisotropic hard etch mask comprises using isotropic reactive ion etching.

25. The method recited in claim 23 wherein removing the layer of photoresist comprises applying an organic solvent.

26. The method recited in claim 20 wherein etching the plurality of gaps comprises performing an anisotropic chemical etch.

27. A wavelength router for receiving, at an input port, light having a plurality of spectral bands and directing subsets of the spectral bands to respective ones of a plurality of output ports, the wavelength router comprising a free-space optical train disposed between the input port and the output ports providing optical paths for routing the spectral bands, the optical train including a reflective lamellar diffraction grating disposed to intercept light traveling from the input port, wherein the reflective lamellar diffraction grating has an arrangement of generally rectangular protrusions spaced along a substrate at an average grating period a, and an average height h and an average width w of the protrusions is such that $h / a > 0.5$ and $w / a < 0.5$.

28. The wavelength router recited in claim 27 wherein the grating period corresponds to a line density $1/a$ between 800 and 1000 protrusions/mm.

29. The wavelength router recited in claim 27 wherein h/a is between 0.84 and 0.96 and wherein w/a is between 0.22 and 0.3.